

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/942,992
Attorney Docket No. Q66040

REMARKS

In the present Amendment, the specification has been amended to correct a typographical error. Specifically, the specification has been amended on page 10, line 2, to replace “component (ii)” with --component (iii)--. This amendment is supported by the specification, for example, on page 3, lines 19-22.

Claim 1 has been amended to incorporate the subject matter of Claim 7. Claim 7 has been canceled, accordingly.

Claims 2-6 have been amended to recite --A heavy duty pneumatic tire--.

Claim 8 has been added as a new claim. This new claim is supported by the specification, for example, from page 16, line 21-page 17, line 5.

No new matter has been added, and thus entry of the Amendment is respectfully requested. Upon entry of the Amendment, Claims 1-6 and 8 will be all the claims pending in the application.

Claims 1-7 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Satoh et al (U.S. Pat. No. 5,726,237).

Applicant respectfully submit that the claims as amended are patentable over Satoh et al for at least the following reasons.

I. **Comparison of Present Invention and Satoh et al**

The present invention is directed to a heavy duty pneumatic tire using a rubber composition as a tread rubber, which rubber composition has:

- (i) the rubber component (A) comprising

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15 to 55% by weight ((1)-2) of a modified styrene-butadiene copolymer rubber, which is obtained by the solution polymerization and has a tin atom introduced into its molecular chain ((1)-1), and

45 to 85% by weight ((2)-2) of natural rubber or synthetic isoprene rubbers ((2)-1), and (ii) the hydrazide compound (B) ((3)-1).

The object of the present invention is to obtain a heavy duty pneumatic tire which is excellent in abrasion resistance and tear resistance, and has low heat-generation property, by using above rubber composition.

Satoh et al discloses a rubber composition for a pneumatic tire. However, Satoh et al does not disclose a rubber composition comprising a modified styrene-butadiene copolymer rubber ((1)-1), natural rubber or synthetic isoprene rubbers ((2)-1), and a hydrazide compound ((3)-1).

Specifically, there are three independent claims in Satoh et al. Independent Claim 1 discloses a rubber composition comprising natural rubber, and dependent Claim 3 further discloses a tin-containing conjugated diene-base synthetic rubber. Further, Satoh et al describes at col. 5, lines 63 to 67 that the ratio of diene based synthetic rubber to natural rubber is in the range of 90/10 to 30/70. However, a hydrazide compound ((3)-1) is not taught or suggested.

Independent Claims 13 and 21 each disclose a rubber composition comprising natural rubber and a hydrazide compound, but do not teach or suggest (1)-1 (tin-modified S-SBR) or (1)-2 (compounding amount).

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In view of the above, Satoh et al does not disclose or suggest the specific rubber composition satisfying all of (1)-1, (1)-2, (2)-1, (2)-2, and (3)-1 as presently claimed.

Further, Satoh et al discloses a pneumatic tire using the rubber composition as a tread rubber. However, Satoh et al does not disclose or suggest a heavy duty pneumatic tire as defined in the present invention. In the working Examples, the rubber composition was used in the tread of a 195/65R15 size tire for use in a passenger vehicle (col. 16, lines 4 to 6).

The object of Satoh et al is to obtain a pneumatic tire excellent in rolling resistant property and wet-skid resistance, which can be attained by the use of the carbon black having a specific surface functional group (col. 4, lines 55-65).

On the contrary, in the present invention, a rubber composition containing all of (1)-1, (1)-2, (2)-1, (2)-2, and (3)-1 are used in combination, together with a widely applicable carbon black as a filler, is used for the tread rubber of a heavy duty pneumatic tire, thereby the objects of the present invention, i.e., abrasion resistance, tear resistance, and low heat-generation property can be attained (page 17 of the present specification, line 18 through page 19, line 14).

II. Comparison of Examples of Satoh et al and Present Invention

The rubber compositions of Examples 1-20 of Satoh et al are analyzed in terms of (1)-1, (1)-2, (2)-1, (2)-2, and (3)-1, and the results are summarized in Table 1. Specifically, Examples 1 to 10 are covered by Claim 1 of Satoh et al and its dependant claims, wherein Examples 1 to 7 satisfy only (1)-1 and (2)-1, and Examples 8 to 10 satisfy only (2)-1. Examples 11 to 20 are covered by Claims 13 and 21, and their dependent claims, wherein Examples 12, 13 and 15 to 20 satisfy only (2)-1 and (3)-1, and Examples 11 and 14 satisfy only (2)-1.

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Accordingly, none of Examples 1 to 20 of Satoh et al satisfy all of (1)-1, (1)-2, (2)-1, (2)-2, and (3)-1 of the present invention.

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Present Claim Requirements	Satoh et al. (Examples 1 to 10)	Table 1	Satoh et al. (Examples 11 to 20)
(1)-1 Solution Polymerized SBR with Tin Contained	Examples 1 to 7: S-SBR (in Tetrachloride coupling) Example 8: Emulsion SBR Examples 9, 10: S-SBR(diethylaminobenzophenone modifying)	○ X	Examples 11 to 20: Emulsion SBR X
(1)-2 SBR Content: 15 to 55 wt%	70 wt%	X 70 wt%	X
(2)-1 Natural or Synthetic Isoprene Rubber	Natural Rubber	○ Natural Rubber	○
(2)-2 Natural Rubber Content 45 to 85 wt%	30 wt%	X 30 wt%	X
(3)-1 Hydrazide Compound	None	Examples 11: silane coupling agent: bis-(3-triethoxsilylpropyl) tetrasulfide Examples 12, 15 to 20: hydrazide compound IDH(isophthaloyl) hydrazide Example 13: hydrazide compound HNH(2-Hydroxy-3-naphthoyl) hydrazide) Example 14: thiadiazole compound (2,5-dimercapto-1,3,4-thiadiazole)	X ○ ○ ○ X

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III. Unexpected Results of Present Invention

As summarized in Table 1, all of the rubber compositions exemplified in Satoh et al comprise 30% by weight of natural rubber and 70% by weight of SBR (modified S-SBR), which does not fall within the specific ranges (45 to 85% by weight of natural rubber and 15 to 55% by weight of modified S-SBR) defined in the present invention.

As described on page 10 of the present specification, lines 7 to 14, that when the compounding ratio of each rubber component falls outside the above ranges (45 to 85% by weight of natural rubber or synthetic isoprene rubbers, and 15 to 55% by weight of modified S-SBR), a rubber composition having a desired physical properties and usable for a tread rubber of a heavy duty pneumatic tire may not be obtained.

As described above, the ratio of the rubber components used in Examples of Satoh et al is clearly falls outside the ranges recited in the present claims. Therefore, it would be expected that the rubber compositions of Satoh et al have far inferior properties to the present invention or even Comparative Examples 3 and 5 described in the present specification.

To further demonstrate the criticality of the component ratios in the present invention, Applicant herewith submit a Declaration executed by Mr. Tatsuro Hamada. The Declaration clearly establishes the superiority, and thus the patentability of the present invention.

In the Declaration, three rubber compositions and tire samples were prepared in the same manner as described in Example 1 of the present specification, except that the rubber components and their ratios are changed according to Satoh et al. These rubber compositions are

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summarized in Table 1. The obtained samples were evaluated and the results are summarized in Table 2.

For direct comparison, the data obtained from Examples 1-2 and Comparative Examples 1-5 in the present specification are presented together with those obtained in Experiments 1-3 in Table 3.

As the data in Table 3 clearly show, when the rubber component ratio of modified SBR to natural rubber (or synthetic isoprene rubber) is 70/30, which is outside the presently claimed range of 15-55/45-85, even if 1.0 part by weight of hydrazine is compounded (Experiment 2), tear resistance and abrasion resistance greatly deteriorate. That is to say, the object of the present invention, i.e., a heavy duty pneumatic tire having excellent abrasion resistance and tear resistance, and low heat-generation property cannot be obtained.

The objects of the present invention have been accomplished, for the first time, by the combination of the above mentioned (1)-1, (1)-2, (2)-1, (2)-2, and (3)-1.

For the foregoing reasons, Applicant respectfully submit that the present invention is not obvious over Satoh et al. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,



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